

## Ruby and Pink Sapphire - Introduction

The Aappaluttoq ruby and pink sapphires are embedded in metamorphic rock that was formed during the geologic processes that created Greenland millions of years ago.



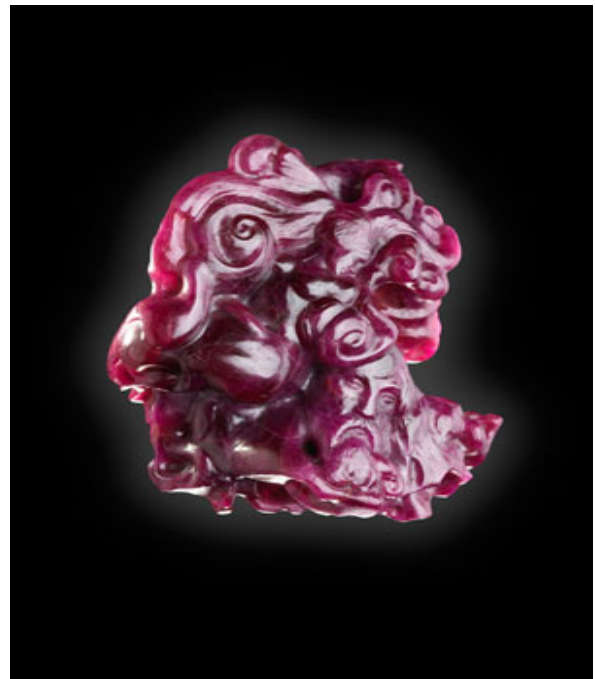
Gem quality rough corundum from Aappaluttoq

Ruby and pink sapphires are family members of the mineral corundum. A very small amount of chromium in the mineral corundum produces a pink color: pink sapphire. A slight increase in chromium and you get the red corundum known as ruby. The pink color graduates to red but there is no standard division between pink sapphire and ruby. The other family members of the corundum family are known as sapphires, which occur in every other color of the rainbow.

Ruby and pink sapphire crystals in the natural state are called “rough” and look like red pebbles. Rough has a wide range of quality, from non-gem (opaque, with many visible impurities) to gem (transparent) quality.

Anything other than the gem portion of rough (less than 10%) has little or no value.

Most large “rubies” are actually crystal masses consisting of more than one crystal in a conglomeration. Close inspection will show that the large masses generally contain very little material that is actually clear, gem quality ruby. TNG has found a number of large crystal masses, among which was a 400 carat mass: it had no potential for polished gemstones and therefore TNG choose to carve it into the Kitaa Ruby. This opaque crystal mass now has some collector value due to the quality of the carving.



Kitaa Ruby



Cut and polished pink sapphire and ruby from Aappaluttoq, Greenland

## The polishing process

Rough ruby and pink sapphire may be either faceted, where the stones has numerous flat faces, or cut into a cabochon which has one rounded face. Conceptually, polishing is a very simple process of grinding away unwanted material. However, the process is done to high tolerances and in the case of faceting, the angles between faces must be measured precisely so that the light will be

properly captured in the gem and returned to the eye causing it to sparkle. If the angles are incorrect, light will simply pass through and the stone will be uninteresting.

Since polishing is done by grinding, the vast majority of the material is lost as dust. What is left over is called the “retention” or “yield.” This yield may be as little as 3% or less to as high as 20%, depending on the size and shape of the rough, the shape being sought, and the cracks and inclusions in the rough material that the cutter cuts around.

Most ruby polishing expertise is in Asia where there is a large, ready workforce with the required training and skills for cutting gemstones. Depending on the ultimate size of the mine, the polishing of all ruby material to be produced from Aappaluttoq could take several hundred (even thousands) of full-time polishers.



Aappaluttoq pink sapphire and ruby

## Rubies expected from Aappaluttoq Mine – Size and Value

The vast majority of corundum obtained from the Aappaluttoq mine is expected to be very small and of low value – bulk samples have shown that about 90% (by weight) of the rough are smaller than 6.3mm. TNG expects that any larger gem quality rubies or pink sapphires found will be relatively easy to sell, but the market for smaller material is not well understood and will require extensive research and test marketing. Once TNG obtains an exploitation (mining) permit and begins sales, TNG will be able to enter into agreements to sell small ruby and pink sapphire. Through these sales TNG will begin to

understand the market for these small stones that, when polished, will sell for as little as \$0.50 USD (3DKK) each and will make up the majority of TNG's production. For the same size and clarity, rubies have a greater value than pink sapphires.

No large gem quality rubies have yet been found at Aappaluttoq. So far the largest, finest polished ruby produced by TNG is a 0.69 carat round stone with a wholesale value of \$2,100 USD. Until Aappaluttoq has been mined for a period of time it is impossible to assess the likelihood of finding large, high-valued gem ruby.

There is very little information available on prices for rough ruby. There can be a large differential between value of rough and polished rubies because even an experienced polisher will not know with certainty what can be polished from an individual rough crystal. Most rough contains inclusions and fractures that are not necessarily apparent, but can cause the stone to break on the polishing wheel. Prices for rough are relatively lower because purchasers of rough take this risk. TNG will build its business selling both rough and polished ruby and pink sapphire. Careful attention will be paid to the difference in prices between rough and polished, and this difference weighed against retention statistics and the cost of building, staffing and maintaining polishing factories to determine the best course of business.

### **How Ruby and Pink Sapphire from Greenland will be Branded.**

A marketing advantage of the rubies and pink sapphires produced in the Aappaluttoq mine will be their potential branding as Greenlandic. Today, most rubies originate in Burma and some countries have legal restrictions on the import of rubies and pink sapphires from Burma. Therefore, purchasers of Greenlandic ruby wishing to import into those countries may require documentation to prove that that the rubies are from Greenland and not Burma. TNG will be able to supply this documentation to purchasers of rough and polished stones who buy directly from TNG.

Marketing the rubies as Greenlandic may benefit certain retailers. If there is sufficient interest, a 'code of conduct' type system may be developed to assure the end purchaser that the ruby they are purchasing is a genuine Greenland stone such as has been done with Canadian diamonds.